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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/944,545	08/31/2001	Donald R. Mullen	1726.7221000	3037

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EXAMINER

COSTANZO, PATRICIA M

ART UNIT	PAPER NUMBER
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2811

DATE MAILED: 07/17/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/944,545

Applicant(s)

MULLEN ET AL.

Examiner

Patricia M. Costanzo

Art Unit

2811

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 June 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-41 is/are pending in the application.
- 4a) Of the above claim(s) 7 - 13, 20, 21, 25, 27, 34, and 35 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 - 6, 14 - 19, 22 - 24, 26, 28 - 33, and 36 - 41 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 August 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Status of Claims

1. Claims 1 – 6, 14 – 19, 22 – 24, 26, 28 – 33, and 36 – 41 were elected for examination.

Drawings

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "2791" has been used to designate both a gap next to spring (2718) and to a part of spring (2768).

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application.

The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 28 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 28 uses the phrase "plate portion is formed in a pre-loaded shape". What is a "pre-loaded shape"? A definition of this phrase has not been found.

Claims 29 and 30 are rejected for the same reason, as is Claim 28 as
Claims 29 and 30 depend from Claim 28.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for
all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. Claims 1 – 5, 15 – 19, 22, 23, 28, 29, 31 – 33, and 36 – 41 are rejected
under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application
Publication No. U. S. 2002/0079571, Application No. 09/379,537 (Takeuchi *et al.*).

Referring to Claim 1: Takeuchi *et al.* disclose an integrated circuit (IC) package
comprising:

a plate portion (Figure 2 (224));
an attachment portion (Figure 2 (230)); and

a spring portion (227) coupled to the plate portion and to the attachment portion.

Takeuchi *et al.* do not specifically disclose an “integrated circuit cover.”

They do however, disclose, what they refer to as a retainer frame (224), an attachment feature (230), and spring clips (227). It is obvious that as the retainer frame couples with heat sink (215), a “cover” is formed, which cover is placed over the IC chip, as is taught by the present invention.

Referring to Claims 2 and 26: Takeuchi *et al.* disclose an integrated circuit (IC) cover, as recited above, further disclosing wherein the IC cover is unitarily molded of a polymer material (Col. 2 [0020] third and fifth sentence).

Referring to Claim 3: Takeuchi *et al.* disclose an integrated circuit (IC) cover, as recited above, except for explicitly disclosing wherein the polymer material has a thermal conductivity of at least 10 watts/meter Kelvin.

Takeuchi *et al.*, however, do teach the importance of removal of heat away from high performance microprocessors (*i.e.*, IC circuits).

It would have been obvious, therefore, to modify the package as taught by Takeuchi *et al.* to provide for polymer material that has a thermal conductivity of at least 10 watts/meter Kelvin to obtain the benefits of efficiently removing heat away from the IC chip.

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Referring to Claim 4: Takeuchi *et al.* disclose an integrated circuit (IC) cover, as recited above, further disclosing a heat sink (Figure 2 (215)) portion coupled to the plate portion.

Referring to Claims 5 and 23: Takeuchi *et al.* disclose an integrated circuit (IC) cover, as recited above, further disclosing wherein the heat sink portion includes extended surfaces (Figure 3, extended surface (303) or (306), or both, depending on one's point of view).

Referring to Claims 15 and 16: Takeuchi *et al.* disclose an integrated circuit (IC) cover, as recited above, further disclosing wherein the spring portion, and a plurality of spring elements (note: Examiner is reading spring portion and spring element to refer to the same spring), is disposed at an end of the plate portion (see, for example, Figure 2, one of spring portions (227) at one end of plate portion (224)).

Referring to Claims 17 and 19: Takeuchi *et al.* disclose an integrated circuit (IC) cover, as recited above, further disclosing wherein the plurality of individual spring elements are disposed a perimeter of the plate portion (see, for example, Figure 2, spring portions (227)).

Referring to Claim 18: Takeuchi *et al.* disclose an integrated circuit (IC) cover, as recited above, further disclosing wherein at least one of the individual spring elements is maintained in a non-relaxed state (see, for example, [0021] lines 9 –11 counting from the bottom of the page).

Referring to Claim 22: Takeuchi *et al.* disclose an integrated circuit (IC) cover, as recited above, further comprising a heat sink portion coupled to the plate portion (Figure 2 (215) and (216)).

Referring to Claim 28, as far as Claim 28 is in compliance with 35 U.S.C. 112 2nd paragraph and as well as an indefinite claim can be understood: Takeuchi *et al.* disclose an integrated circuit (IC) cover, as recited above, further disclosing wherein the plate portion is formed in shaped so as to exert pressure to the at least one die when the attachment portion is coupled to the circuit board (see, for example, last sentence of [0021]).

Referring to Claim 29, as far as Claim 29 is in compliance with 35 U.S.C. 112 2nd paragraph and as well as an indefinite claim can be understood: Takeuchi *et al.* disclose an integrated circuit (IC) cover, as recited above, further disclosing wherein the plate portion is formed so as to exert pressure to the at least one die in a direction toward the circuit board (Figure 2 (224)).

Referring to Claim 31: Takeuchi *et al.* disclose an integrated circuit (IC) cover, as recited above, further disclosing a circuit board (Figure 6 (603)).

Referring to Claim 32: Takeuchi *et al.* disclose an integrated circuit (IC) cover, as recited above, further disclosing wherein the spring portion exerts pressure between the plate portion and the at least one first die (see, for example, last sentence of [0021]).

Referring to Claim 33: Takeuchi *et al.* disclose an integrated circuit (IC) cover, as recited above, further disclosing wherein at least one of the individual spring elements is maintained in a non-relaxed state (see, for example, [0021] lines 9 –11 counting from the bottom of the page).

Referring to Claim 36: Takeuchi *et al.* disclose an integrated circuit (IC) cover, as recited above, including the limitations recited in Claim 36.

Referring to Claim 37: Takeuchi *et al.* disclose an integrated circuit (IC) cover, as recited above, further disclosing wherein center lines of the plurality of spring portions are orientated so as to be non-radial relative to a centroid of the plate portion (Figure 2 (227)s).

Referring to Claim 38: Takeuchi *et al.* disclose an integrated circuit (IC) cover, as recited above, further disclosing wherein each of the center lines of the plurality of spring portions are orientated approximately tangentially in relation to a corresponding one of the plurality of edges (Figure 2 (227)s).

Referring to Claim 39: Takeuchi *et al.* disclose an integrated circuit (IC) cover, as recited above, further disclosing wherein the plurality of spring portions are oriented in a similar rotational direction with respect to a centroid of the plate portion (Figure 2 (227)s).

Referring to Claim 40: Takeuchi *et al.* disclose an integrated circuit (IC) cover, as recited above, further disclosing wherein the plurality of spring portions are configured to cooperatively accommodate displacement of the plate portion from a relaxed position (first sentence [0020]).

Referring to Claim 41: Takeuchi *et al.* disclose an integrated circuit (IC) cover, as recited above, further disclosing wherein at least one of the plurality of spring portions is maintained in a non-relaxed state when at least one of the plurality of attachment portions is coupled to a circuit board such that the plate portion overlies at least one IC (see, for example, Figure 6 and [0022]).

7. Claims 6, 24, and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application Publication No. U. S. 2002/0079571, Application No. 09/379,537 (Takeuchi *et al.*) in view of U.S. Patent No. 6,349,032 (Chan *et al.*).

Referring to Claims 6 and 24: Takeuchi *et al.* disclose an integrated circuit (IC) cover, as recited above, except for disclosing wherein the heat sink portion includes fins.

Chan *et al.* teach wherein heat sink portion includes fins (Figure 1 (14)).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device disclosed by Takeuchi *et al.* by providing for a heat sink portion including fins as disclosed by Chan *et al.* because it was very well known at the time of the invention to do so and to obtain

the advantage of increasing the rate and amount of heat removal from the chip of interest.

Referring to Claim 30, as far as Claim 30 is in compliance with 35 U.S.C. 112 2nd paragraph and as well as an indefinite claim can be understood: The proposed devise of Takeuchi *et al.* and Chan *et al.* discloses an integrated circuit (IC) cover, as recited above, further comprising a spring portion coupling the attachment portion to the plate portion (Chan *et al.*, Figure 2 (34) and ((36a)).

8. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application Publication No. U. S. 2002/0079571, Application No. 09/379,537 (Takeuchi *et al.*) in view of U.S. Patent No. 6,229,706 (Cook *et al.*).

Takeuchi *et al.* disclose an integrated circuit (IC) cover, as recited above, except for disclosing wherein the spring portion has a cross section comprising a molded cantilever hinge portion.

Cook *et al.* teach wherein the spring portion has a cross section comprising a molded cantilever hinge portion (Figure 1 (14) to provide intimate thermal contact between a heat sink and a heat generating electrical component such as an IC chip (Abstract).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device disclosed by Takeuchi *et al.* by providing for a the spring portion having a cross section comprising a molded cantilever hinge portion as disclosed by Cook *et al.* because it was very well

known at the time of the invention to do so and to obtain the advantage of providing intimate thermal contact between a heat sink and a heat generating electrical component such as an IC chip to increase the rate and amount of heat removal from the chip of interest.

Conclusion

Any inquiry concerning this communication should be directed to Patricia Costanzo at 703 305-5675 on Monday – Friday from 8:00 A.M. – 5:00 P.M.

If attempts to reach the examiner by telephone are unsuccessful Supervisory Primary Examiner Tom Thomas can be reached at 703 308 -2772.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group Receptionist at 703 308-0956.

Using facsimile machines to transmit correspondence is encouraged.

Papers may be faxed directly to Examiner P. Costanzo at 703 746-8672.

The official Technical Center 2800 before-final FAX number is 703-872-9318 and the after-final FAX number is 703-872-9319. These FAX numbers will provide the FAX sender with an auto-reply verifying receipt of their FAX by the United States Patent and Trademark Office.

If there should be a problem while faxing to the Office, please contact Technical Center 2800 Customer Service at 703-306-3329.

pmc
July 12, 2002

Steven Loh
Steven Loh